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Integrated optic modulator and splitter damage at 1053nm

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We are designing and developing a single mode fiber laser and modulation system for use in an inertial confinement fusion research laser, the National Ignition Facility (NIF). Our fiber and integrated optic oscillator/modulator system generates optical pulses of around 30 nanoseconds duration, at one kilohertz, with up to 500 nanoJoules energy. This is enough to potentially damage some of the single mode fiber and waveguide components.

To test these components, we have built a test system using a diode-pumped Nd:YLF laser, producing 10 microJoules in 120ns at 500 Hz. This system has been used to test commercial lithium niobate integrated optic modulators, silica-on-silicon waveguide splitters, lens-coupled dichroic mirror splitters, and other fiberoptic components. We present results of damage tests and efforts to improve performance.

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